Loudoun County
Department of Fire, Rescue, and Emergency Management
INFORMATIONAL BULLETIN

Subject: 12-lead ECG Information	**Date of Issue: November 19, 2009**
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Approved: Linda Hale, Deputy Chief	

Accurate 12-lead acquisition must be of a high enough quality for the ED physician to make true diagnostic decisions. As such, the Department continues to be enthusiastically in support of this program and its potential benefit to the patients we see and treat.

With assistance from INOVA-LHC-Lansdowne we have moved forward with the **transmission of 12 lead ECGs** to Lansdowne hospital. This will go "live" **Tuesday November 24, 2009 at 0600 hr.** INOVA-LHC purchased 26 modems to coincide with the number of 12 lead capable machines in the system at the time. The modem works off a cell phone data plan through AT&T. We are aware that there will be areas of the county in which AT&T coverage may not allow for the 12 Lead transmissions until closer to a population center.

Because not all LifePak are 12 lead capable, we know that you are placing your 12 lead capable machines on the first out ambulance(s). An identification number had to be assigned for the instances in which a station may have multiple 12 lead capable machines and run multiple patients that require 12 lead transmissions. As such, units have been identified as their station (e.g., Sterling) and a number (Sterling 1). In no way is this to indicate the unit number. We did not label the print out on the 12 lead to read a specific unit number (e.g. A 613-4) as that would be more confusing when it is not on that designated ambulance.

- The ultimate goal of transmitting 12 leads through the radio system is expected to occur in late Spring 2010.

- The transmission site will be INOVA Loudoun Hospital Lansdowne as they are the medical control for any patient suspected of a STEMI within Loudoun County, for Loudoun County Fire-Rescue.

The procedure to transmit is fairly self explanatory:

1. Input pertinent patient data (e.g. name, age, etc)
    a. A Physician may be hesitant to act on your 12-lead transmission if they cannot identify, by name, that the medical decision they are about to render is on that specific patient. .
2. Acquire 12 Lead as outlined in the Acquisition & Transmission of 12 Lead ECG procedure.
3. Press Transmit button
    a. If the report ("12-Lead 1"), site ("INOVA LHC L") and prefix (Station and #) are correct press Send. These areas have been preprogrammed so a provider should not have to change any of these setting.
    b. A series of messages indicates the progress of your transmission. A transmission report will print documenting success or failure of the transmission.
    c. If the machine has been altered to send a "continuous ECG" then the transmission must be cancelled to end or it will continue. Please do not enter into this mode unless directed to do so by Medical Control.

We are already seeing cases where the EMS obtained 12-lead is a major factor in the physician's development of the treatment plan. However, as our skills in interpretation are new and the data from the monitor's interpretation is often cryptic, there is a strong need to have the ED physician take an early look at the EMS 12-lead. A second, very important benefit is the immediate feedback of the physician's interpretation of that tracing, its displayed results and the quality of the tracing against their expectations. This is invaluable in helping our providers gain the experience with, and understanding of, this new tool. Therefore, Dr. Morgan has directed that when a 12-lead has been obtained in the field, it is the responsibility of the ALS provider to take the 12-lead to the ER physician and ask them to sign or initial the 12-lead. This practice will mirror the ED's internal policy of having all ED acquired tracings be presented to and initialed by the ED physician.

There have been a few cases of poor quality ECG acquisition. By far the most likely cause is poor electrode contact. There are several rapid methods to trouble shoot this problem. The first is adequate skin prep. We, as a profession, are not used to the need to prepare the skin for our usual 3-lead monitoring. The filter setting on the 3-lead suppressed the artifact and provided us with a clean view. However, the sensitivity of the 12-lead requires a lower filter setting, meaning our skin prep and electrode placement are much more important. This is often shown to be artifact in some or all leads.

- The skin needs to be cleaned, possibly shaved, and slightly abraded to allow for a good ECG. This allows the gel to penetrate into the skin and gain good electrical conduction. By using a clean 4x4 gauze pad, we can often remove enough dead material, dirt, and natural body oils to allow the electrode and the gel to create a good electrical connection. The next consideration is the age of the electrodes. Electrodes that have spent a prolonged period of time exposed to air will result in the gel drying out, potentially enough to degrade the electrical connection. Electrodes taken from the bag and pre-attached to the leads may be part of the problem. Try using electrodes from a newly opened bag or from another sealed package, but do not pre-attach the electrodes. Also,

remember to close the bag to help keep the remaining electrodes as fresh as possible. Lastly, we have been coached to be as gentle as possible in the treatment of our patients. This is a good thing, but in acquiring 12-leads, somewhat higher pressure in the application of the leads may improve contact enough to solve your problem. Do not hurt the patient, but make sure your electrode to skin contact is solid.

- Should you be receiving artifact in only a couple of leads, it is possible to locate the exact spot(s) that is giving you trouble. For instance, if Leads I and III are the poor quality leads, look to the left arm lead for poor contact. If the V3 lead looks bad, then check V3. As your experience in obtaining these tracings grows, so will your trouble shooting capability.

It has been noted that at times the LP12 is indicating "Noisy Data" and when overridden to acquire the 12 lead the interpretation ability of the machine is disabled. Under certain conditions, particularly if 12-LEAD is pressed immediately after electrode application, the screen may display the message NOISY DATA. This may be due to a brief period of chemical instability between the electrodes and the patient that is not viewable on the ECG monitor screen but is detected as noisy data by the diagnostic frequency response filter used during 12-lead acquisition. In general, it is best to wait at least 30 seconds after applying the last electrode before pressing the 12-LEAD button. Also, good skin preparation will shorten the stabilization time.

Should you have any questions or are still having difficulties acquiring high quality tracings; you are encouraged to seek help through the EMS Battalion Chiefs. The EMS BCs can arrange both in station and in hospital training to help solve the experience related issues this new technology is presenting.